III. CLAIM AMENDMENTS

1. (Original) A method for generating an estimate of the impulse response of a radio channel, comprising the steps of:

- generating an initial estimate of the impulse response of a radio channel,

- equalizing a signal by using the initial estimate,

- obtaining feedback information from the signal after equalization,

- generating an updated estimate of the impulse response of the radio channel by using said feedback information,

- equalizing the signal by using said updated estimate and said feedback information and

- decoding the equalized signal.

2. (Original) A method according to claim 1, wherein the step of obtaining feedback information from the signal after equalization is performed after the step of decoding the equalized signal, so that said feedback information concerns the equalized and decoded signal.

3. (Original) A method according to claim 1, wherein the step of obtaining feedback information from the signal after

equalization is performed at least partly before the step of decoding the equalized signal, so that said feedback information concerns at least partly the equalized but not decoded signal.

4. (Currently Amended) A method according to claim 1, comprising the steps of:

a) receiving a transmission sequence containing, modulated onto a carrier, a certain known symbol sequence and certain unknown symbols,

b) converting the received transmission sequence into a sample sequence so that a certain first group of samples within said sample sequence represents said known symbol sequence and a certain second group of samples within said sample sequence represents said unknown symbols,

c) using said first group of samples to generate an estimate of the impulse response of the radio channel over which the transmission sequence was received,

d) equalizing said sample sequence by using the estimate generated at step (c), thus generating:

- a first piece of hard decision output that maps a number of equalized samples from said second group of samples into information symbol values, and

- a first piece of soft decision output that describes the estimated reliability of said hard decision output,

and

e) making a number of decoding decisions by using said first piece of hard decision output and first piece of soft decision output.

5. (Original) A method according to claim 4, wherein step e) comprises the step of making a number of soft decoding decisions, thus generating a second piece of soft decision output, and the method further comprises the step of feeding back said second piece of soft decision output to said step of generating an updated estimate of the impulse response of the radio channel.

6. (Original) A method according to claim 4, wherein step e) comprises the step of making a number of hard decoding decisions, thus generating a second piece of hard decision output, and the method further comprises the step of feeding back said second piece of hard decision output to said step of generating an updated estimate of the impulse response of the radio channel.

7. (Original) A method according to claim 4, comprising the step of feeding back said first piece of hard decision output to the step of generating an updated estimate of the impulse response of the radio channel.

8. (Original) A method according to claim 4, comprising the step of feeding back said first piece of soft decision output to the step of generating an updated estimate of the impulse response of the radio channel.

9. (Original) A method according to claim 4, comprising repeated iterations through steps c), d) and e) so that at the second and each subsequent time of executing step c) both said first group of samples and said feedback information are used to generate an estimate of the impulse response of the radio channel over which the transmission sequence was received.

10. (Original) A method according to claim 9, wherein at the second and each subsequent time of executing step d) there is used the most recently generated updated estimate of the impulse response of the radio channel to equalize said sample sequence.

11. (Original) A method according to claim 4, additionally comprising the steps of:

- feeding back said decoding decisions to the step of equalizing said sample sequence,

- repeatedly iterating through steps d) and e) and

- at the second and each subsequent time of executing step d) using both said sample sequence and feedback information from said decoding decisions to equalize said sample sequence.

12. (Original) A method according to claim 4, comprising the steps of

- repeatedly iterating a first number of times through steps c), d) and e) so that at the second and each subsequent time

of executing step c) both said first group of samples and said feedback information are used to generate an estimate of the impulse response of the radio channel over which the transmission sequence was received and

- repeatedly iterating a second number of times through steps d) and e) so that at the second and each subsequent time of executing step d) both said sample sequence and feedback information from said decoding decisions are used to equalize said sample sequence.

13. (Original) A method according to claim 4, wherein

- step a) comprises the step of receiving simultaneously at least certain first and second transmission sequences where within said first transmission sequence the first group of samples represents a certain first known symbol sequence and within said second transmission sequence the first group of samples represents a certain second known symbol sequence which is different than said first known symbol sequence and

- steps b) to e) are performed separately to both said first transmission sequence and said second transmission sequence.

14. (Original) A method according to claim 1, comprising the steps of:

- between the steps of equalizing a signal and decoding the equalized signal, processing the signal and

- between the steps of obtaining feedback information from the signal after equalization and generating an updated estimate, inversely processing the feedback information to cancel from the feedback information certain effects caused by said step of processing the signal.

15. (Original) A method for generating an estimate of the impulse response of a radio channel, comprising the steps of:

- determining the value of a quantity that describes the estimated quality of a received signal,

- generating an initial estimate of the impulse response of a radio channel,

- equalizing the received signal by using the initial estimate,

- comparing the determined value of the quantity that describes the estimated quality of the received signal against a certain first threshold,

- if said comparison shows the estimated quality of the received signal to be better than indicated by said first threshold,

- obtaining feedback information from the signal after equalization,

- generating an updated estimate of the impulse response of the radio channel by using said feedback information and

- equalizing the signal by using said updated estimate; and

- decoding the equalized signal.

16. (Original) A method according to claim 15, wherein said step of equalizing the signal comprises the step of equalizing the signal by using said updated estimate and said feedback information.

17. (Original) A method according to claim 15, comprising the steps of:

- if said comparison shows the estimated quality of the received signal to be better than indicated by said first threshold,
- obtaining feedback information from the signal after equalization,
- generating an updated estimate of the impulse response of the radio channel by using said feedback information,
- equalizing the signal by using said updated estimate and
- iteratively repeating at least once said steps of obtaining feedback information, generating an updated estimate and equalizing the signal.

18. (Original) A method according to claim 17, comprising the step of, after a certain iterative round of obtaining feedback information, generating an updated estimate and equalizing the signal, at least partly comparing the signal to the signal before

said iterative round, and if the comparison shows that the compared signals differ from each other less than a certain second threshold, terminating said iteration.

19. (Original) A method according to claim 17, comprising the steps of

- setting a maximum number for iterative rounds of obtaining feedback information, generating an updated estimate, equalizing the signal and comparing it to the signal before said iterative round, and

- if said maximum number has been reached, terminating said iteration.

20. (Original) An arrangement for generating an estimate of the impulse response of a radio channel, comprising:

- a channel estimator for generating an initial estimate of the impulse response of a radio channel,

- a signal equalizer for equalizing a signal, the signal equalizer being coupled to the channel estimator so as to receive the estimate generated by the channel estimator,

- a decoding unit coupled to the signal equalizer for decoding the equalized signal, and

- means for coupling feedback information from a point located after the signal equalizer into the channel estimator and the signal equalizer;

wherein

- the channel estimator is arranged to generate an updated estimate of the impulse response of the radio channel by using said feedback information and

- the signal equalizer is arranged to re-equalize the signal by using said feedback information.

21. (Original) An arrangement according to claim 20, wherein the decoding unit comprises a series coupling of a first decoder and a second decoder, and the coupling for providing feedback information is made after said first decoder but before said second decoder.

22. (Original) An arrangement according to claim 20, wherein the decoding unit comprises a series coupling of a first decoder and a second decoder, and the coupling for providing feedback information is made after said second decoder.

23. (Currently Amended) An arrangement according to claim 20, wherein the coupling for providing feedback information to the channel estimator is made after the ~~the~~ signal equalizer but before the decoding unit.

24. (Original) An arrangement according to claim 20, comprising a controlling unit arranged to estimate the quality of a received signal, so that said controlling unit is coupled to an enabling input of the channel estimator so as to either enable or disable

the iterative updating of a channel estimate with feedback information depending on the estimated quality of the received signal.

25. (Original) An arrangement according to claim 24, wherein said controlling unit is coupled to a radio receiver for implementing the quality estimation of a received signal, and said controlling unit is also arranged to receive an indication of estimated reliability in at least one of signal detecting and channel decoding, and said controlling unit is arranged to set the maximum number of iterations in said iterative updating of a channel estimate on the basis of at least one of the estimated quality of a received signal and said estimated reliability.

26. (Original) An arrangement according to claim 20, comprising a first signal processing block coupled between the signal equalizer and the decoding unit, and a second signal processing block coupled between the decoding unit and the channel estimator, so that said second signal processing block is arranged to implement the inverse of the signal processing operations implemented by said first signal processing block.